

Application No. 10/669,285  
Amendment dated September 21, 2005  
Reply to Office Action of June 23, 2005

Docket No. 1232-5165

**Amendments to the Claims:**

Claims 1-4 and 7-12 are pending in this application. Claims 1 and 10 are independent.

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1 (CURRENTLY AMENDED): A position detecting method of detecting a position of a ~~mask~~ mark formed on an object, said method comprising steps of:

forming an image of the mark on a sensor;

performing a first process that processes an image signal obtained by the sensor with respect to each of a plurality of values of a parameter of the first process;

performing a second process that processes a signal obtained by the first process to obtain a feature value with respect to each of the plurality of values of the parameter;

determining a value of the  $[[a]]$  parameter based on feature values obtained by the second process and a reference value defined with respect to the mark; and

detecting a position of the mark based on a signal obtained by the first process using the value of the parameter determined in said determining step.

2 (PREVIOUSLY PRESENTED): A method according to claim 1, wherein the first process comprises zero phase filtering, and the parameter of the first process comprises an order of the filtering.

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Application No. 10/669,285  
Amendment dated September 21, 2005  
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Docket No. 1232-5165

3 (PREVIOUSLY PRESENTED): A method according to claim 1, wherein the first process comprises approximation of the image signal using a polynomial, and the parameter of the first process comprises an order of the polynomial.

4 (PREVIOUSLY PRESENTED): A method according to claim 1, wherein the feature value corresponds to an interval between elements of the mark.

5-6 (CANCELLED):

7 (PREVIOUSLY PRESENTED): A method according to claim 1, wherein said determining step determines the value of the parameter based on deviations of the feature values from the reference value.

8 (PREVIOUSLY PRESENTED D): A method according to claim 1, wherein said determining step determines the value of the parameter based on a variation of a plurality of the feature value with respect to each of the plurality of values of the parameter.

9 (PREVIOUSLY PRESENTED): A method according to claim 1, wherein the first process comprises a process for removing a noise in the image signal.

10 (CURRENTLY AMENDED): A position detecting apparatus for detecting a position of a mark on an object, said apparatus comprising:

Application No. 10/669,285  
Amendment dated September 21, 2005  
Reply to Office Action of June 23, 2005

Docket No. 1232-5165

a detecting system to detect an image of the mark; and  
a processing system to perform a first process that processes an image signal obtained by said detecting system with respect to each of a plurality of values of a parameter of the first process, to perform a second process that processes a signal obtained by the first process to obtain a feature value with respect to each of the plurality of values of the parameter, to determine a value of the parameter based on [[the]] feature values obtained by the second process and a reference value defined with respect to the mark, and to detect a position of the mark based on a signal obtained by the first process using the determined value of the parameter.

11 (CURRENTLY AMENDED): An exposure apparatus for transferring a pattern to an object, said apparatus comprising:

a position detecting apparatus ~~according to~~ as defined in claim 10 for detecting a position of a mark formed on the object.

12 (CURRENTLY AMENDED): ~~A device fabrication method~~ of fabricating a device, said method comprising steps of:

transferring a pattern to an object using an exposure apparatus as defined in claim 11;

developing the object to which the pattern has been transferred; and  
processing the developed object to fabricate the device.

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